

WHAT IS CLAIMED IS:

1. A method for creating charged-particle-beam exposure data containing a description of an exposure sequence of character patterns in a deflection region of a specimen to perform exposure of a charged particle beam according to a character projection technique, comprising:

selecting first or second values as a parameter to transfer one character pattern and then transferring a subsequent character pattern, the first value regarding performance of a shaping deflector which deflects the charged particle beam so that the charged particle beam is applied to an arbitrarily character aperture formed in a CP aperture mask and a character beam having the shape of the character aperture is thereby created, and the second value regarding performance of an objective deflector which deflects the character beam so that the character beam is applied to an arbitrarily position of the deflection region of the specimen; and

determining the exposure sequence of the character patterns in the deflection region in accordance with the selected parameter.

2. The method for creating charged-particle-beam exposure data according to claim 1, wherein

a settling time of the shaping deflector is compared with a settling time of the objective deflector, and a longer one of the settling times is

selected as the parameter; and

to performing exposures of all character patterns in the deflection region, an exposure sequence of the character patterns is determined so that the sum of  
5 selected settling times is minimum.

3. The method for creating charged-particle-beam exposure data according to claim 2, wherein the exposure sequence of the character patterns is determined by using a "traveling salesman problem"  
10 solution algorithm so that the sum of selected settling times is minimum.

4. The method for creating charged-particle-beam exposure data according to claim 1, wherein

the correlation between a deflection distance of  
15 the charged particle beam deflected the shaping deflector on the CP aperture mask and a deflection distance of the character beam deflected the objective deflector on the specimen is obtained;

in a case where two character patterns are  
20 sequentially transferred, when a first deflection distance of the beam deflected by one deflector and a deflection distance of the beam deflected the other deflector and a second deflection distance converted to the deflection distance of the beam deflected the one  
25 deflector are compared with each other in accordance with the correlation, a longer one of the deflection distances is selected as the parameter; and

to performing exposures of all character patterns in the deflection region, an exposure sequence of the character patterns is determined so that the sum of selected deflection distances is minimum.

5           5. The method for creating charged-particle-beam exposure data according to claim 4, wherein the correlation is obtained in accordance with the settling times of the shaping deflector and the objective deflector.

10           6. The method for creating charged-particle-beam exposure data according to claim 4, wherein the exposure sequence of the character patterns is determined by using a "traveling salesman problem" solution algorithm so that the sum of selected  
15 deflection distances is minimum.

          7. A method for manufacturing a semiconductor device, wherein a charged-particle-beam exposure of a semiconductor device pattern is performed by using exposure data created in accordance with the method for  
20 creating charged-particle-beam exposure data defined in claim 1.

          8. A program for implementing a function of creating exposure data containing a description of an exposure sequence of character patterns in a deflection  
25 region of a specimen to perform exposure of a charged particle beam according to a character projection technique, the program comprising:

a function that works such that first or second values is selected as a parameter to transfer one character pattern and then transferring a subsequent character pattern, the first value regarding  
5 performance of a shaping deflector which deflects the charged particle beam so that the charged particle beam is applied to an arbitrarily character aperture formed in a CP aperture mask and a character beam having the shape of the character aperture is thereby created, and  
10 the second value regarding performance of an objective deflector which deflects the character beam so that the character beam is applied to an arbitrarily position of the deflection region of the specimen; and

a function that works such that the exposure  
15 sequence of the character patterns in the deflection region is determined in accordance with the selected parameter.

9. The program according to claim 8, wherein  
a settling times of the shaping deflector is  
20 compared with a settling time of the objective deflector, and a longer one of the settling times is selected as the parameter; and

when performing exposures of all character patterns in the deflection region, an exposure sequence  
25 of the character patterns is determined so that the sum of selected settling times is minimum.

10. The program according to claim 9, wherein

the exposure sequence of the character patterns is determined by using a "traveling salesman problem" solution algorithm so that the sum of selected settling times is minimum.

5           11. The program according to claim 8, wherein  
the correlation between a deflection distance of  
the charged particle beam deflected the shaping  
deflector on the CP aperture mask and a deflection  
distance of the character beam deflected the objective  
10 deflector on the specimen is obtained;

in a case where two character patterns are  
sequentially transferred, when a first deflection  
distance of the beam deflected by one deflector and  
a deflection distance of the beam deflected an other  
15 deflector and a second deflection distance converted  
to the deflection distance deflected the one deflector  
are compared with each other in accordance with the  
correlation, a longer one of the deflection distances  
is selected as the parameter; and

20           when performing exposures of all character  
patterns in the deflection region, an exposure sequence  
of the character patterns is determined so that the sum  
of selected deflection distances is minimum.

25           12. The program according to claim 11, wherein the  
exposure sequence of the character patterns is  
determined by using a "traveling salesman problem"  
solution algorithm so that the sum of selected

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deflection distances is minimum.